Practice Question Set For A-Level
Subject : Physics
Paper-1 Topic : 2 (Mechanics)

Merit Minds
www.merit-minds.com
Exam Preparation and Free Resources

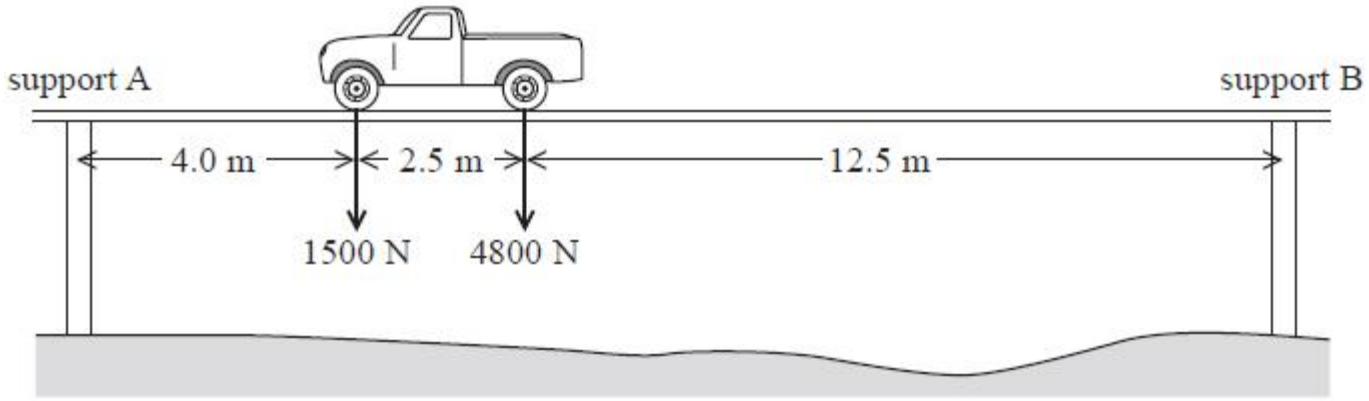
Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Q1.

A beam bridge is a rigid structure that consists of one horizontal beam supported at each end.

The diagram shows a bridge with a uniform beam of mass 8 500 kg.

A small truck is crossing the beam bridge. The position of the truck and the forces of the truck on the bridge are shown, but are not drawn to scale.



(a) (i) State the conditions necessary for the bridge to be in equilibrium.

(2)

.....
.....
.....
.....

(ii) Calculate the vertical forces at each of the bridge supports.

(5)

.....
.....
.....
.....
.....
.....
.....
.....

Force at A = ...

Downloaded from www.merit-minds.com

Force at B = ...

The Volgograd Bridge is a concrete beam bridge across the River Volga in Russia.

In 2010 the bridge was closed to traffic due to windy conditions leading to resonance of the structure.

(i) Explain what is meant by resonance in this context.

(2)

.....

.....

.....

.....

(ii) To suppress the oscillations of the bridge, dampers were installed.
Explain how damping resulted in the suppression of the oscillations of the bridge.

(3)

.....

.....

.....

.....

.....

.....

.....

.....

(iii) Each damper contains an enclosure filled with a fluid. When this fluid is subjected to a magnetic field, the viscosity of the fluid greatly increases.
Describe how the behaviour of the fluid would change in a magnetic field and how this would be useful for the operation of the dampers.

(2)

.....

.....

.....

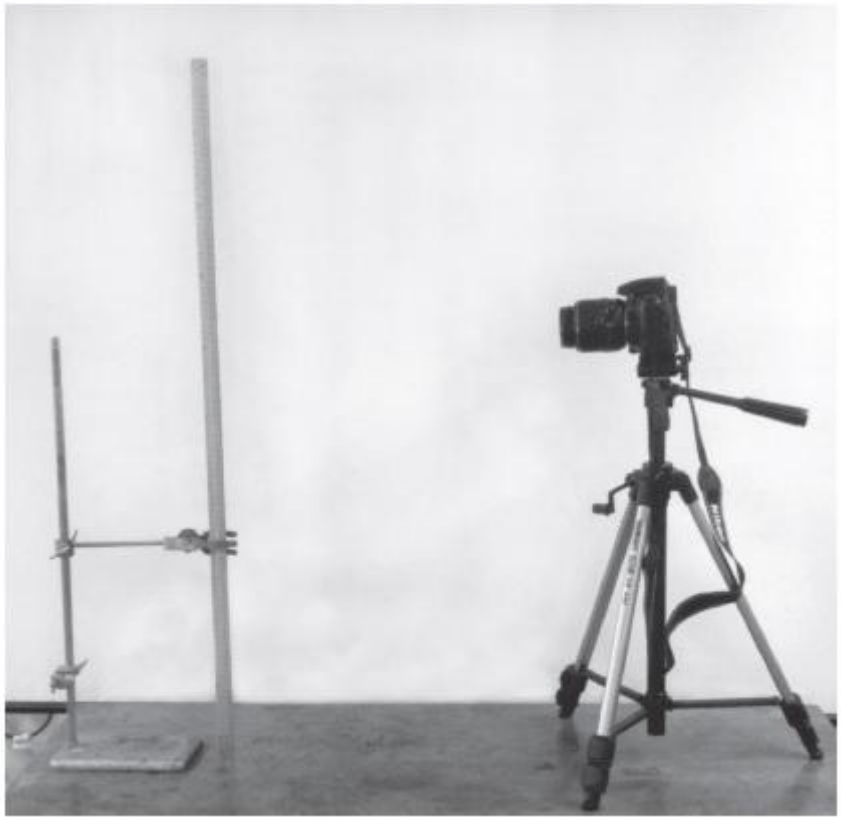
.....

(Total for question = 14 marks)

Downloaded from www.merit-minds.com

Q2.

A student carries out an experiment to find the acceleration of free fall.



(a) In this experiment the student releases a small steel ball in front of a metre rule and uses a video camera to record its motion. The camera captures 30 images per second, which may be played back one image at a time.

(i) Explain how the acceleration of free fall could be determined using the recording.

(4)

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(ii) Describe a systematic error which could arise.

(1)

.....

.....

.....

Downloaded from www.merit-minds.com

.....

(b) Describe one property of the steel ball that makes it suitable to use in this experiment and explain why this property makes it suitable.

(2)

.....

.....

.....

.....

.....

(c) Explain an advantage of using a video camera to take measurements for this experiment rather than using a stopwatch.

(2)

.....

.....

.....

.....

.....

(Total for question = 9 marks)

Downloaded from www.merit-minds.com